

QUARTERLY STATUS REPORT No. 3

Period 14 January 1965 - 13 April 1965

MODIFICATION OF 82-INCH COUDE SPECTROGRAPH AT McDONALD OBSERVATORY

Contract NASr-230

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The purpose of this contract is to convert the McDonald Observatory 82-inch coude spectrograph from an inefficient and cumbersome instrument almost useless for planetary work into one competitive with the best coude spectrographs elsewhere, and one which is well-adapted to planetary work.

A. Review of Progress Prior to this Reporting Period

Pressures of time forced work on this project to fall into three categories. First, a large number of extensive but essentially external modifications to the spectrograph were required in order to prepare the way for the necessary internal improvements. As discussed in the second quarterly report, these were completed in time to permit the spectrograph to be used in the 1964-65 Mars velocity quadratures and opposition, along with new high efficiency gratings. Secondly, modifications other than adjustments and testing of the spectrograph ceased during the six-month period from mid-December 1964 through mid-June 1965, in order to permit uninterrupted use of the spectrograph whenever appropriate for Mars and other planetary observations; the present quarterly report falls entirely in this period. Finally, a number of internal changes will be required to increase the speed of the instrument beyond the gains produced by better coude focal images and faster gratings.

B. Progress during the Present Reporting Period

The nights of January 12 through 24 were made available for Mars velocity quadrature observations, primarily to Dr. Schorn of the Jet Propulsion Laboratory. Because of poor weather, only a small amount of additional material was gathered to add to the very successful earlier and longer run in late December and early January.

Nine nights (March 9 through 17) were assigned to Dr. T. Owen from the Lunar and Planetary Laboratory of The University of Arizona, to obtain improved N-plate spectra of CO₂ bands of Mars around 8700Å and to attempt for the first time to observe Martian CO₂ at 10,400Å, using Z plates. The weather being very favorable and the observer efficient, a highly successful set of N-plate exposures was obtained. Three excellent full nights were used for all-night (10.5 hr) Z-plate exposures; CO₂ may be measurable on them, but is certainly very weak.

Although final conclusions must wait reports of the investigators, it now appears that these three runs on Mars have succeeded in establishing more accurately the amount of water vapor and something of its local distribution at a particular Martian season, and have provided material which should improve on the measures of CO₂ -- line equivalent widths for the Martian atmosphere, with useful applications to the determination of Martian surface pressure.

C. Personnel Connected with the Contract

No new personnel have been added since the last reporting period.

D. Financial Report

NASA Form 1030 (2-64) for this contract is submitted quarterly by the Auditor's Office of The University of Texas.